PATENT
YR1-30

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of: Susan Ciaburro et al : Date: March 15, 2005
Serial No. 09/912,167 : Group Art Unit: 2684
Filed: July 23, 2001 : Examiner: John J. Lee
For: Methods for Testing Multibeam Satellite Systems Using Input Power Telemetry and Output Noise Power :

APPEAL BRIEF TRANSMITTAL LETTER

Mail Stop Appeal Brief-Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Enclosed is an Appeal Brief, in triplicate, for the above patent application.

___ Applicant petitions for an extension of time for month(s). If an additional extension of time is required, please consider this a petition therefor.
Fee:

___ An extension for month(s) has already been secured; the fee paid therefore is deducted from the total fee due for the total months of extension now requested. Extension fee due with this request:

_X_ Applicant believes that no extension of time is required. However, this conditional petition is being made to provide for the possibility that applicant has inadvertently overlooked the need for a petition for extension of time.

___ The Appeal Brief Fee was paid in a prior appeal in which there was no decision on the merits by the Board of Appeals.

___ The Appeal Brief Fee is enclosed herewith. Fee: $500.00
_X_ Charge the Appeal Brief Fee to my Credit Card. Credit Card Payment Form PTO-2038 is enclosed herewith.

_X_ The total fee due is $500.00

_X_ Address all correspondence to Joyce Kosinski, Karambelas & Associates, 655 Deep Valley Drive, Suite 303, Rolling Hills Estates, CA 90274.

This letter is submitted in triplicate.

Respectfully submitted,
AW Karambelas
Anthony W. Karambelas
Reg. No. 25,657

Karambelas & Associates
655 Deep Valley Drive, Suite 303
Rolling Hills Estates, CA 90274
Telephone: (310) 265-9565
Facsimile: (310) 265-9545

ZPW
AF
2684.

PATENT
Docket No. YR1-30

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT:	Susan Ciaburro et al
SERIAL NUMBER:	09/912,167
FILING DATE:	July 23, 2001
FOR:	Methods for Testing Multibeam Satellite Systems Using Input Power Telemetry and Output Noise Power
GROUP ART UNIT:	2684
EXAMINER:	John J. Lee

CERTIFICATE OF MAILING
UNDER 37 CFR 1.8

Mail Stop Appeal Brief-Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Identification of Transmitted Papers

Appeal Brief in triplicate, Appeal Brief Transmittal Letter in triplicate, Credit Card Payment Form PTO-2038, return receipt postcard

I hereby certify that the above-identified correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to Mail Stop Appeal Brief-Patents, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on **March 15, 2005**.

Joyce E. Kosinski
Joyce E. Kosinski
Depositor

Karambelas & Associates
655 Deep Valley Drive, Suite 303
Rolling Hills Estates, CA 90274
Telephone: (310) 265-9565
Facsimile: (310) 265-9545

PATENT
YR1-30

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF APPEALS

Appeal No.______________________

In re Application of: SUSAN CIABURRO ET AL
Serial No.: 09/912,167
Filed: July 23, 2001
For: METHODS FOR TESTING MULTIBEAM SATELLITE SYSTEMS USING INPUT POWER TELEMETRY AND OUTPUT NOISE POWER

APPELLANTS' BRIEF ON APPEAL

Anthony W. Karambelas
655 Deep Valley Drive, Suite 303
Karambelas & Associates
Rolling Hills Estates, CA 90274

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF APPEALS

In re Application of: SUSAN CIABURRO ET AL	: Date: March 15, 2005
Serial No.: 09/912,167	: Group Art Unit: 2684
Filed: July 23, 2001	: Examiner: John J. Lee
For: METHODS FOR TESTING MULTIBEAM SATELLITE SYSTEMS USING INPUT POWER TELEMETRY AND OUTPUT NOISE POWER	:

APPELLANTS' BRIEF ON APPEAL

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This appeal is taken from the decision of the Examiner in the Office Action dated November 3, 2004 finally rejecting Claims 1-11 of the above-identified patent application. This brief is submitted in accordance with the provisions of 37 C.F.R. §1.192.

REAL PARTY IN INTEREST

The real party in interest is Space Systems/Loral, Inc. which acquired rights to the present application by way of an assignment from the inventors.

RELATED APPEALS AND INTERFERENCES

There are no other appeals or interferences known to appellants, appellants' legal representative, or the assignee which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

STATUS OF CLAIMS

Claims 1-11 are currently pending in this application; claims 1-11 were finally rejected in the Office Action dated November 3, 2004. Appellants appeal from this final rejection of claims 1-11.

STATUS OF AMENDMENTS

With regard to the status of amendments, two Office Actions were issued during prosecution of this application. No claims were amended in response to the first Office Action dated May 6, 2004. No claims were amended in response to the final Office Action dated November 3, 2004. The claims as they currently stand are presented in the Appendix.

SUMMARY OF INVENTION

In the specification on page 3, line 2 through page 5, line 4 the following Summary of the Invention is presented: To accomplish the above and other objectives, the present invention provides for methods for testing multibeam satellite communication systems, including antennas and transponders. The methods use input power telemetry and output noise power to test satellite transponders and antennas while the satellite is in orbit. One of the methods employs at least two earth stations, one for RF testing and one for telemetry and commanding, with the RF test earth station providing a backup for the telemetry and commanding earth station. The other methods may use one or more earth stations to perform testing.

A first exemplary method that generates receive antenna pattern measurements comprises the following steps. The satellite attitude is positioned so the starting orientation angle of the slew for the uplink beam under test is over the payload test earth station providing the RF test uplink. Typically, the edge of the uplink beam pattern in chosen as the start point for the subsequent slew. A test signal is uplinked from the earth station to a receive antenna on the satellite. Commands are uplinked from a second earth station that cause the satellite to perform a slow constant attitude translation (slewing) over predetermined orientation angles. The power level of the uplink test signal is sensed while the satellite is slewed. Downlink telemetry corresponding to the sensed power level and orientation angles are generated and transmitted to a second ground station that is located at a geographically distinct location from the first earth station. The sensed power level and orientation angles contained in the downlinked telemetry are processed and analyzed to verify the operation of the receive antenna.

The first exemplary method uses more than one earth station to perform receive antenna pattern measurements, compared to the use of a single earth station disclosed in US Patent No. 6,157,817. The improvement provided by the present invention over the NSTAR method is that, instead of commanding discrete attitude steps to perform receive antenna pattern measurements, the present method

commands a slow, continuous, constant attitude sweep. This allows for more data points to be taken, and reduces the time for the sweep. Slewing of the satellite is faster than the stop and measure technique used to test NSTAR satellites.

A second exemplary method uses a single earth station to generate transmit antenna pattern measurements without using an uplink carrier. The second exemplary method comprises the following steps. The satellite attitude is positioned so the start orientation angle of the slew for the downlink beam under test is over the payload test earth station receiving the downlink noise. Typically, the edge of the downlink beam pattern is chosen as the start point for the subsequent slew. Commands are uplinked from an earth station that causes the satellite to perform a slow constant attitude translation over predetermined orientation angles. Downlink noise power of a transponder is received at the earth station and measured in a specified bandwidth while the satellite is slewed. Downlink telemetry corresponding to the orientation angles are generated and transmitted to the earth station. The measured noise power levels and orientation angles contained in the downlink telemetry are processed and analyzed to verify the operation of the transmit antenna.

A third exemplary method generates an input chain frequency response curve that serves to verify the frequency characteristics of the transponder equipment up to the signal strength telemetry monitoring circuit. This method comprises the following steps. The uplink beam corresponding to the transponder equipment under test is positioned over a payload test earth station. RF signals at selected frequencies having the same power level are uplinked from the earth station to the satellite. Downlink telemetry corresponding to the signal strength is generated and transmitted to the earth station. The signal strength telemetry, earth station uplink power and frequency are recorded and processed produce the input chain frequency response curve.

A fourth exemplary method generates an input chain transfer curve that serves to verify the power characteristics of the transponder equipment up to the signal strength telemetry monitoring circuit. This method comprises the following steps. The uplink beam corresponding to the transponder equipment under test is positioned over a payload test earth station. RF signals at selected power levels having the same frequency are uplinked from the earth station to the satellite. Downlink telemetry corresponding to the signal strength is generated and transmitted to the payload test earth station. The signal strength telemetry and earth station uplink power is recorded and processed to produce the input chain transfer curve.

A fifth exemplary method that generates an output chain frequency response curve that serves to verify the frequency characteristics of the entire transponder if the transponder is in a linear gain mode or from the output of an amplifier (TWTA) to the

downlink antenna if the transponder is in automatic level control mode. This method comprises the following steps. A downlink beam is positioned over an earth station. The noise power within a small bandwidth centered around a selected one of a plurality of frequencies of interest is measured at an earth station. The noise power measurements are continued until the noise power at all frequencies of interest are measured. The recorded noise power measurements are processed to generate an output chain frequency response curve.

A sixth exemplary method that verifies the gain of the transponder comprises the following steps. A downlink beam is positioned over an earth station. The noise power over a small bandwidth at center frequency or other frequency of interest is measured at an earth station. The noise power measurements are made in both linear mode and automatic level control mode at a variety of gain/level steps, if the satellite is equipped with commandable gain/level steps. The recorded noise power measurements are processed to generate gain characteristics of the transponder.

ISSUES

The issues in this appeal are:

Whether claims 1-11 are unpatentable under 35 U.S.C. 103(a) over Norin et al US Patent No. 6,157,817 in view of Norin US Patent No. 6,233,433.

GROUPING OF CLAIMS

With regard to the specific grounds of rejection that are in issue, it is respectfully submitted that Claims 1-11 stand or fall together.

DESCRIPTION OF REFERENCES

In U. S. 6,157,817 to Norin et al, filed February 4, 1999, issued December 5, 2000, there is disclosed a method of testing in-orbit communications satellite receive antennas from a single ground test station. The ground test station transmits an uplink test signal to the orbiting satellite. Telemetry circuitry onboard the satellite measures the power level of the uplink signal received and converts it to a corresponding digital value. The satellite's position is slewed over angles approximately covering the receive antenna areas of reception. The power level of the received uplink test signal and satellite orientation information are transmitted to the ground test station in the satellite's telemetry data stream. A computer at the ground test station plots the power level with respect to the satellite's corresponding orientation to map the receive antenna pattern. In an alternative embodiment, a plurality of receive antennas are tested simultaneously.

In U. S. 6,233,433 to Norin, filed February 4, 1999, issued May 15, 2001, there is disclosed the new satellite communications repeater test method allows multiple transponders to be tested from a single ground test station. The satellite's receive antenna is aligned with the ground station antenna and uplink test signals are transmitted to the satellite. The uplink test signal is converted to a corresponding downlink signal which is distributed to the transponders fed by the receive antenna. Prior to transmission from the satellite, the amplified downlink signals are sampled and combined and/or switches into a single path having a frequency spectrum which includes the frequency bands of the sampled downlink signals. The combined signal is transmitted to the ground test station from a wide angle transmit antenna. The received downlink signals are measured and stored for later processing to validate the operational characteristics of the transponders. In an alternative embodiment, the sampling and combining matrix includes switches for selecting the sampled signals to be combined.

ARGUMENT

The Examiner has rejected claims 1-11 under 35 U.S.C. 103(a) as being unpatentable over Norin et al U. S. Patent 6,157,817 in view of Norin U. S. Patent 6,233,433.

The Examiner states regarding claim 1, Norin '817 discloses that a method of testing a satellite (Fig. 1) receive antenna (4 in Fig. 1) of a multibeam satellite system (Fig. 1 and col. 3, line 47 through col. 4, line 24). Further the Examiner submits that Norin '817 discloses that uplinking a test signal (3 in Fig. 1) from a payload test earth station (Fig. 1) to the receive antenna (4 in Fig. 1) (Fig. 1 and col. 4 lines 5-50). The Examiner continues that Norin '817 discloses that slewing the satellite over orientation angles using a slow constant attitude translation (Fig. 1, 2, abstract and col. 4, lines 5-24 where teaches the satellite's position is slewed over angles approximately covering the receive antenna areas of reception). Further the Examiner states that Norin '817 discloses that sensing a power level of the test signal on board the satellite during slewing (Fig. 1, 2, abstract and col. 4, line 5 through col. 5, line 13, where teaches telemetry circuitry onboard the satellite senses the power levels of the signals and keeps track of the onboard equipment). Continuing, the Examiner says Norin '817 discloses that transmitting downlink telemetry comprising sensed power level and orientation angles of the satellite from the satellite to the payload test earth station (Fig. 1, 2 and col. 3, line 47 through col. 4, line 23 where teaches the satellite transmits downlink telemetry, power levels, angles, and other data to transmission back to earth). The Examiner continues that Norin '817 discloses that processing the sensed

power level and said orientation angles to verify the operation of said receive antenna on the satellite (col. 4, line 25 through col. 5, line 13 and Fig. 1, 2, where teaches the satellite receive antenna configures and processes the slewing angles and sensed power levels).

The Examiner, however, admits that Norin '817 does not specifically disclose the limitation "transmitting downlink telemetry from the satellite to a telemetry and command earth station that is located at a geographically separate location from the payload test earth station". However, the Examiner argues, Norin '433 discloses the limitation "transmitting downlink telemetry from the satellite to a telemetry and command earth station that is located at a geographically separate location from the payload test earth station" (col. 1, lines 44-48, Fig. 4, 5 and col. 4, line 14 through col. 5, line 17, where teaches prior tests required an uplink signal to be transmitted from multiple uplink sites and downlink signals were received at test stations within each downlink beam). The Examiner concludes that it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the Norin '817 system as taught by Norin '433, thus allowing measurements at multiple points in coverage area, as discussed by Norin '433 (col. 1, lines 50-55).

Appellants respectfully submit that in Norin '817 there is disclosed a method of testing in-orbit communications satellite receive antennas from a single ground test station. The ground test station transmits an uplink test signal to the orbiting satellite. Telemetry circuitry onboard the satellite measures the power level of the uplink signal received and converts it to a corresponding digital value. The satellite's position is slewed over angles approximately covering the receive antenna areas of reception. The power level of the received uplink test signal and satellite orientation information are transmitted to the ground test station in the satellite's telemetry data stream. A computer at the ground test station plots the power level with respect to the satellite's corresponding orientation to map the receive antenna pattern. In an alternative embodiment, a plurality of receive antennas are tested simultaneously.

Appellants respectfully contend that in Norin '817 in Fig. 1, 2, the abstract and at col. 4, lines 5-24 where the Examiner contends that the satellite's position is slewed over angles approximately covering the receive antenna areas of reception, this language is found in the abstract and a general reference to slewing the satellite at element 72 in Fig. 2 is generally set out. Appellants respectfully contend that elsewhere in the Norin '817 patent it is stated, for example, at col. 2, lines 44 et seq. "The satellite is slewed in elevation and azimuth over an angle encompassing the receive antenna's area of reception. During slewing, the satellite's position is monitored by the telemetry circuit and reported in the telemetry data stream. The

"telemetry stream containing the uplink power measurement and the position information is received by the ground test station and stored for later processing to produce a map of the receive antenna pattern......" Continuing at col. 2, line 52 "Multiple uplink signals of various frequencies and polarizations are transmitted as the satellite is slewed." Appellants respectfully contend that no where in these teachings is it taught, suggested or implied as required in element 2 of claim 1 "slewing the satellite over orientation angles using a slow constant attitude translation". Norin '817 teaches at col. 2, line 43 et seq. "The satellite is slewed in elevation and azimuth over an angle encompassing the receive antenna's area of reception" which is clearly distinguishable over "slewing the satellite over orientation angles using a slow constant attitude translation" as required by element 2 of claim 1.

Appellants respectfully contend although at col. 2, line 47 of Norin '817 it is stated "The telemetry stream containing the uplink power measurement and the position information is received by the ground test station and stored for later processing to produce a map of the receive antenna pattern", this does not clearly teach "sensing a power level of a test signal onboard the satellite during slewing;" as required by element 3 of claim 1.

Appellants respectfully submit, as admitted by the Examiner, that all of element 4 of claim 1 is conspicuously absent "transmitting downlink telemetry comprising sensed power level and orientation angles of the satellite from the satellite to a telemetry and command earth station that is located at a geographically separate location from the payload test earth station;". Further, Appellants respectfully contend that since the preceding four elements of claim 1 have not been taught, suggested or implied as set out in claim 1, element 5 cannot possibly be suggested, taught or implied by Norin '817 which requires "processing the sensed power level and said orientation angles to verify the operation of said receive antenna on the satellite."

Appellants respectfully contend in Norin '817 at col. 2, line 47 et seq. it is stated "The telemetry stream containing the uplink power measurement and the position information is received by the ground test station and stored for later processing to produce a map of the receive antenna pattern." which does not teach verifying the operation of said receive antenna on the satellite as required by element 5 of claim 1, in addition to being distinguishable in the manner in which the sensed power level is acquired for reasons stated above.

Appellants respectfully submit that at col. 4, line 5 through col. 5, line 13 and Fig. 1, 2 and the abstract there is a broad ranging discussion relating to sensing the power level of signals and keeping track of the onboard equipment, in addition to specifically at col. 4, line 65 et seq. "While the uplink test signal 3 is being received, the

"satellite position is slewed in step 72 over angles which encompass the area of reception of receive antenna 4. Slewing is accomplished by incrementally adjusting the satellite roll (elevation) and pitch (azimuth) orientation......Slewing an in-orbit satellite's position to validate the contour of a shaped antenna is described in Egly et al., 'In-Orbit Test of the First Hughes United States Direct Broadcast Satellite'...." all of which does not cure the deficiencies as recited above with regard to the manner in which the method of the instant claims outlines slewing, sensing power levels, transmitting downlink telemetry and processing the sensed power level to verify the operation of the receive antenna on the satellite as required by claim 1.

In Fig. 1, 2 and col. 3, line 47 through col. 4, line 23, there is a broad ranging discussion of a sample communications satellite test configuration for a single receive antenna including transmitting downlink signals and satellite telemetry data including satellite orientation, signal power, including the use of wide angle telemetry antenna which is used so that the ground station can communicate with the satellite regardless of its orientation. Appellants respectfully contend that no where in this recited passage or in the accompanying figures does this teach, suggest or imply slewing the satellite over orientation angles as defined in the instant claims; sensing the power level during slewing; or transmitting and processing as required in claim 1.

Furthermore, Appellants respectfully contend that in Norin '817 at col. 4, line 25 through col. 5, line 13 and in Figs. 1 and 2, again containing a broad ranging discussion of transmitting downlink signals including satellite orientation, temperature, signal power, status and sensing the power levels of the signals, including the satellite receiving and uplink beacon transmitted from an uplink site to keep the satellite aligned as it orbits the earth, and finally beginning at col. 4, line 65 et seq., slewing the satellite in step 72 over angles which encompass the area of reception of receive antenna 4 where slewing is accomplished by incrementally adjusting the satellite roll (elevation) and pitch (azimuth) orientation, all of which Appellants respectfully contend is completely distinguishable from the slewing, sensing a power level, transmitting downlink telemetry and processing the sensed power level as required in elements 2-5 of claim 1.

Appellants respectfully contend in Norin '433 at col. 1, lines 44-48 and in Figs. 4, 5 and at col. 4, line 14 through col. 5, line 17, there is not disclosed as contended by the Examiner "transmitting downlink telemetry comprising sensed power level and orientation angles of the satellite from the satellite to a telemetry and command earth station that is located at a geographically separate location from the payload test earth station;" as required by element 4 of claim 1. Appellants respectfully contend that at these recited passages relied upon by the Examiner in col. 1 and cols. 4 and 5 "A test

"signal is transmitted from ground station 2, amplified, and rebroadcast in downlink beams (8a-8d), which are sampled within their respective areas of coverage (10a-10d)." does not teach, suggest or imply transmitting the downlink telemetry from the satellite to a telemetry and command earth station that is located at a geographically separate location from the payload test earth station as required by element 4 of claim 1 and the same is the case with regard to Norin '433 at col. 1, lines 50-55 relating to ground test stations that are portable conducting power tests where the power level of the downlink signal is at or near maximum.

Appellants respectfully disagree that it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Norin '817 system as taught by Norin '433 thus allowing measurements at multiple points in coverage areas as discussed by Norin '433 at col. 1, lines 50-55.

Furthermore, Appellants respectfully contend that there is no suggestion or motivation for one of ordinary skill to combine Norin '817 directed to a method for in orbit multiple receive antenna pattern testing with Norin '433 directed to a apparatus and method of testing multi-beam satellite repeater in orbit from a single ground station using a sampling and combining matrix aside from one common inventor in each of the references and Appellants' own disclosure which inter alia requires transmitting downlink telemetry from the satellite to a telemetry and command earth station that is located at a geographically separate location from the payload test earth station which is deficient and conspicuously absent in Norin '817 and not cured by Norin '433 for reasons recited above.

The Examiner goes on to say regarding claim 2, Norin '817 and Norin '433 disclose all the limitations as discussed in claim 1. Furthermore, the Examiner contends Norin '817 further discloses that processing the noise power level and orientation angles to verify operation of the transmit antenna (24 in Fig. 1) on the satellite (col. 4, line 14 through col. 5, line 17 and Figs. 4, 5). However, the Examiner states Norin '817 does not specifically disclose the limitation "measuring downlink noise in a small bandwidth at the telemetry and command earth station while the satellite is translated". However, the Examiner reasons that Norin '433 discloses the limitation "measuring downlink noise in a small bandwidth at the telemetry and command earth station while the satellite is translated", directing Appellants' attention to col. 4, line 14 through col. 5, line 23, abstract, and Figs. 4, 5, where the Examiner contends there is taught received downlink signal is measured and recorded the signal information, power level within each downlink band, for reducing possibility of adding unwanted noise. The Examiner concludes that it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the Norin

'817 system as taught by Norin '433, the motivation being to achieve reducing unwanted noise by performing in-orbit satellite tests in satellite communication system.

Appellants respectfully submit that Norin '817 and Norin '433 do not disclose all of the limitations as discussed in claim 1 for the reasons recited above. Further, Appellants respectfully submit that at element 24 in Fig. 1 on the satellite and at col. 4, line 14 through col. 5, line 17 and in Figs. 4 and 5 there is not taught, as the Examiner contends, the processing of noise power level and orientation angles to verify operation of the transmit antenna since as stated at col. 3, line 65 through col. 4, line 1 "The high power amplifier 20 increases the power of the downlink signal 11, while an output channel filter 22 removes signals not within the downlink band prior to transmission back to earth via transmit antenna 24.", the only reference to element 24 that Appellants can discern; and that in the recited passages at col. 4, line 14 through col. 5, line 17 and in Figs. 4 and 5 there is no mention or teaching of processing the noise power level in orientation angles to verify operation of the transmit antenna on the satellite as required by claim 2 but therein is disclosed a broad ranging discussion of satellite telemetry transmission, ground stations, a flow diagram of an embodiment of the new receive antenna test method and a method of slewing employed in the reference, all of which are completely distinguishable from the method as claimed in claim 2 of the instant invention.

Appellants respectfully contend, in addition to Norin '817 not specifically disclosing the limitation of processing the noise power level and orientation angles to verify operation of the transmit antenna as contended by the Examiner, Appellants agree with the Examiner that Norin '817 does not specifically disclose the limitation of "measuring downlink noise in a small bandwidth at the telemetry and command earth station while the satellite is translated". However, Appellants respectfully disagree with the Examiner that Norin '433 discloses the limitation "measuring downlink noise in a small bandwidth at the telemetry and command earth station while the satellite is translated" at col. 4, line 14 through col. 5, line 23, in the abstract and Figs. 4 and 5 where Appellants respectfully contend there is no suggestion, implication or teaching that the noise power level and orientation angles are processed to verify operation of the transmit antenna. Appellants therefore respectfully disagree with the Examiner that Norin '433 discloses, suggests or implies measuring downlink noise in a small bandwidth at the telemetry and command earth station while the satellite is translated at col. 4, line 14 through col. 5, line 23, in the abstract and Figs. 4 and 5. Appellants respectfully contend that no where in the recited passages or in Figs. 4 and 5 is there any indication, suggestion or teaching that measuring downlink noise in a small bandwidth at the telemetry and command earth station is being done while the satellite

is translated and furthermore that this noise power level and orientation angles are processed to verify operation of the transmit antenna on the satellite. Therefore, Appellants respectfully conclude it would not have been obvious to one of ordinary skill in the art at the time the invention was made to modify Norin '817 as taught by Norin '433 for the reasons recited above relating to their improper combinability, in addition to the conspicuous absence of the teachings related to measuring the downlink noise in a small bandwidth as recited above and processing the noise power level and orientation angles as required by claim 2.

The Examiner goes on to say regarding claim 3, Norin '817 discloses that the uplinked commands cause a slow constant attitude translation of the satellite, directing Appellants' attention to col. 4, lines 5-24 and Fig. 1. Appellants respectfully submit that claim 3 is patentably distinguishable from Norin '817 for the reasons recited above with regard to claim 2 and further that the limitation as set out in claim 3 requiring that uplinked commands cause a slow constant attitude translation of the satellite is no where to be found in col. 4, lines 5-24 and in Fig. 1 as contended by the Examiner, but merely a discussion at col. 4, line 19 that "the satellite can receive an uplink beacon transmitted from an uplink site to keep the satellite aligned as it orbits the earth. A wide angle telemetry antenna 34 is used so that the ground station can communicate with the satellite regardless of its orientation."

The Examiner goes on to say with regard to claim 4, Norin '817 discloses that the uplinked commands cause a discrete steps (power levels) in attitude translation of the satellite (col. 4, lines 5-39 and Fig. 1). Appellants respectfully contend that claim 4 is patentably distinguishable over Norin '817 for the reasons recited above with regard to claim 2 and further that the limitation as set out claim 4 requiring that " the uplinked commands cause a discrete steps in attitude translation of the satellite" is no where taught, suggested or implied at col. 4, lines 5-39 and in Fig. 1. Therein Appellants respectfully submit there is a broad ranging discussion wherein it is stated "the satellite can receive an uplink beacon transmitted from an uplink site to keep the satellite aligned as it orbits the earth.....a signal generator 38 for generating uplink test signals, an amplifier 40 to increase the power of the signal for transmission....The test antenna 44 transmits the uplink signal to the satellite and receives the telemetry stream....". Appellants conclude, as can readily be seen from these recited passages relied upon by the Examiner, that no where is there suggested, taught or implied that the uplinked commands cause a discrete steps in attitude translation of the satellite as required by claim 4.

The Examiner goes on to state regarding claim 5 that Norin '817 and Norin '433 disclose all the limitations as discussed in claims 1 and 2 and, furthermore, Norin '817

further discloses that positioning an uplink beam is over an earth station (col. 2, line 36 through col. 3, line 2 and Fig. 1). The Examiner goes on to say that Norin '817 teaches that uplinking signals at different frequencies of interest from the earth station to the satellite (col. 6, lines 4-33 and Fig. 5, 6, where teaches received uplink signals of different respective frequencies from ground station). The Examiner goes on to say that Norin '817 teaches that generating downlink telemetry on-board the satellite that corresponds to the signal strengths of respective signals at the different frequencies (col. 4, lines 5-64, Fig. 1, 6 and col. 6, lines 4-33, where teaches computer generate downlink telemetry (power levels) of different respective frequencies). The Examiner goes on to say that Norin '817 teaches that recording the signal strength telemetry and uplink frequency at the earth station (col. 4, lines 25-64 and Fig. 1, where teaches the ground station stores the translated position and signal information from telemetry data stream). Further, the Examiner states that Norin '817 teaches that processing the recorded signal strength telemetry and uplink frequency to produce the input power frequency response curve (col. 4, lines 25-64 and Fig. 1, where teaches the ground station stores the translated position and signal information from telemetry data stream for processing, computer plots the power levels as a function of the satellite's position to produce a map of the receive antenna pattern).

Appellants respectfully disagree with the Examiner that Norin '817 and Norin '433 disclose all the limitation of claim 5 as discussed with regard to claims 1 and 2 for the reasons recited above by Appellants. Furthermore, at col. 2, line 36 through col. 3, line 2 and Fig. 1 Appellants respectfully contend that there is merely disclosed that "Multiple uplink signals of various frequencies and polarizations are transmitted as the satellite is slewed." not "uplinking signals at different frequencies of interest from the earth station to the satellite;" as required by element 2 of claim 5. Further at col. 6, lines 4-33 and in Figs. 5 and 6, although there is a general discussion of uplinking signals of different respective frequencies and in one embodiment the ground test station transmitting multiple uplink test signals 3a and 3b with frequencies corresponding to the receive antennas being tested; this is all being done to allow multiple receive antennas to be tested simultaneously from a single ground test station reducing the time required to complete the tests and not to generate an input chain frequency response curve as results from the method of claim 5. Furthermore, at col. 4, lines 5-64 and Figs. 1, 6 and col. 6, lines 4-33, although there is a broad ranging discussion of transmitting downlink signals including such information as satellite orientation, temperature, signal power, status and other data and that the satellite senses the power levels of the signals and keeps track of the on-board equipment, this is done as can be seen at col. 4, lines 35 et seq. "At the conclusion of the test, the

"computer plots the power levels of the received downlink signals as a function of the satellite's position to produce a map of the receive antenna pattern." This is to be contrasted to generating a input chain frequency response curve that results from the method of practicing claim 5 which is completely distinguishable from the reference.

Appellants respectfully contend that in Norin '817 at col. 4, lines 25-64 and in Fig. 1, although at line 31 there is disclosed "A computer 46 stores the translated position and signal information from the telemetry data stream for later processing", thereafter it is clearly stated "At the conclusion of the test, the computer plots the power levels of the received downlink signals as a function of the satellite's position to produce a map of the receive antenna pattern. The map is used to verify the integrity of the receive antenna after launch." not to generate an input chain frequency response curve as results from practicing the method of claim 5.

Appellants respectfully contend that Norin '817 at col. 4, lines 25-64 and in Fig. 1, although it teaches as previously stated "At the conclusion of the test, the computer plots the power levels of the received downlink signals as a function of the satellite's position to produce a map of the receive antenna pattern.", this does not in any way teach, suggest or imply the method as set out in claim 5 relating to generating an input chain frequency response curve: including the steps of positioning, uplinking, generating downlink telemetry, transmitting the signal strength telemetry, recording the signal strength telemetry and processing the recorded signal strength telemetry and uplink frequency to produce the input power frequency response curve as set out in the claim.

Regarding claims 6 and 8, the Examiner states that Norin '817 and Norin '433 disclose all the limitations as discussed in claims 1 and 2. Appellants respectfully disagree that Norin '817 and Norin '433 alone or in any combination disclose all of the limitations as discussed in claims 1 and 2 for the reasons recited above with regard to claims 1 and 2. Further, no where in either of Norin '817 or Norin '433 is there taught, suggested or implied that the signal strength telemetry as claimed in claim 6 is transmitted to a second earth station that is located at a geographically separate location from the uplinking earth station. Such an earth station as set out in claims 6 and 8 is conspicuously absent from Norin '817 and Norin '433.

Regarding claim 7, the Examiner states that Norin '817 and Norin '433 disclose all the limitations as discussed in claims 1 and 5. Furthermore, the Examiner states that Norin '817 further discloses that processing the recorded signal strength telemetry to produce the input chain transfer curve corresponding to input power frequency response (col. 4, lines 25-64 and Fig. 1, 3f, where teaches the ground station stores the translated position and signal information from telemetry data stream for

processing, computer plots the power levels as a function of the satellite's position to produce a map of the receive antenna pattern).

Appellants respectfully disagree that Norin '817 and Norin '433 disclose all the limitations as discussed in claims 1 and 5 for reasons recited above which are respectfully incorporated herein. Further, Appellants respectfully contend that in Norin '817 at col. 4, lines 25-64 and in Fig. 1, 3f where there is taught at lines 34 et seq. "At the conclusion of the test, the computer plots the power levels of the received downlink signals as a function of the satellite's position to produce a map of the receive antenna pattern. The map is used to verify the integrity of the receive antenna after launch." is completely distinguishable from the method as defined in claim 7 which is directed to generating an input chain transfer curve for a multibeam satellite communication system comprising steps of positioning, uplinking, generating, transmitting, recording and processing as set out in claim 7 that are no where to be taught, suggested or implied in either of Norin '817 or Norin '433 or in any improper combination thereof.

The Examiner goes on to say regarding claim 9, Norin '817 and Norin '433 disclose all the limitations as discussed in claims 2 and 7. However, the Examiner submits that Norin '817 does not specifically disclose the limitation "measuring noise power of the downlink beam over a small bandwidth centered around a plurality of selected frequency of interest at the earth station". However, the Examiner contends that Norin '433 discloses the limitation "measuring noise power of the downlink beam over a small bandwidth centered around a plurality of selected frequency of interest at the earth station", citing col. 4, line 14 through col. 5, line 23, abstract, and Figs. 3 and 4, where teaches received downlink signal, that switched for selecting the sampled signals to be combined to produce a single combined signal/beam, is measured and recorded the signal information, power level within each downlink band, for reducing possibility of adding unwanted noise. The Examiner concludes that it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the Norin '817 system as taught by Norin '433 with the motivation to do so being to achieve reducing unwanted noise by performing in-orbit satellite tests in satellite communication system.

Appellants respectfully disagree that Norin '817 and Norin '433 disclose all the limitations of claim 9 as discussed in claims 2 and 7 for the reasons cited above with regard to those distinctions drawn by Appellants in claims 2 and 7 which are hereby respectfully incorporated by reference. Appellants note, as the Examiner admits, that Norin '817 does not specifically disclose the limitation "measuring noise power of the downlink beam over a small bandwidth centered around a plurality of selected frequency of interest at the earth station". This deficiency is no where cured at the

recited passages relied upon by the Examiner at col. 4, line 14 through col. 5, line 23, in the abstract, or in Figs. 3 and 4 relating to using a switching matrix that reduces the possibility of adding unwanted noise to the combined signal as set out in col. 5, lines 18-20. The recited passages relied upon by the Examiner in no way suggest, teach or imply measuring noise power of the downlink beam over a small bandwidth centered around a plurality of selected frequency of interest at the earth station and inter alia processing the noise power measurements to generate the output chain frequency response curve. Appellants respectfully disagree with the Examiner that therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Norin '817 system as taught by Norin '433 with the motivation to achieve reducing unwanted noise by performing in-orbit satellite tests in satellite communication system.

Regarding claim 10, the Examiner goes on to say that Norin '817 and Norin '433 disclose all the limitations as discussed in claims 2 and 7 and furthermore, that Norin '817 further discloses that processing the recorded noise power measurements to generate a gain measurement of the transponder, citing col. 3, line 31 through col. 4, line 24 and Fig. 1, 2.

Appellants respectfully disagree that Norin '817 and Norin '433 disclose all the limitations of claim 10 as discussed in claims 2 and 7 for the reasons recited above with regard to the patentable distinctions of claims 2 and 7 over these references which are hereby respectfully incorporated by reference. Furthermore, Appellants respectfully contend that at col. 3, line 31 through col. 4, line 24 and in Figs. 1 and 2 there is disclosed "Multi-beam communications satellites have at least one and typically multiple receive antennas, each with one or more feed horns. These are required to be tested after a successful launch.... A schematic diagram of a sample communication satellite test configuration for a single receive antenna 4 is shown in Fig. 1.... After the uplink signal 3 is received by the receive antenna 4, the input channel filter G removes signals not within the uplink band. Within receiver 2 a low noise amplifier 8 amplifies the uplink signal 3 while adding minimal noise, and a mixer converts it to a corresponding downlink signal 11....the satellite can receive an uplink beacon transmitted from an uplink site to keep the satellite aligned as it orbits the earth. A wide angle telemetry antenna 34 is used so that the ground station can communicate with the satellite regardless of its orientation."

Appellants respectfully contend that no where in this disclosure is there any teaching, suggestion or implication that a gain measurement of a transponder may be generated inter alia by measuring noise power of the downlink beam over a small bandwidth at a selected frequency at the earth station; and processing the recorded

noise power measurements to generate a gain measurement of the transponder. Appellants are at a loss to discern anywhere in this disclosure where measurement of noise power of the downlink beam over any bandwidth is achieved no less a small bandwidth at a selected frequency at the earth station, nor is noise ever disclosed except for the recitation at col. 3, line 54 which is totally inapplicable merely relating to a low noise amplifier while adding minimal noise at line 56.

The Examiner goes on to state regarding claim 11, Norin '817 and Norin '433 disclose all the limitations as discussed in claims 2 and 7. Appellants respectfully disagree that Norin '817 and Norin '433 disclose all the limitation of claim 11 as discussed in claims 2 and 7 for the reasons recited above relating to the patentable distinctions of claims 2 and 7 over Norin '817 and Norin '433 which are hereby respectfully incorporated by reference. Furthermore, no where in Norin '817 and Norin '433 is there any suggestion to combine them as suggested by the Examiner for the reasons recited above and in any event there is no disclosure in either reference that the method of claim 10 relating to a gain measurement of transponder wherein the noise power of the downlink beam is measured at the center of the bandwidth at the selected frequency is in any way taught, suggested or implied nor is the measurement of noise power of the downlink beam in any way taught, suggested or implied at any frequency for the reasons set out in claim 10.

Appellants respectfully submit in view of the above remarks all of the appealed claims have been shown to contain patentable subject matter and to be patentably distinguishable over the prior art of record, Norin '817 and Norin '433 under 35 U.S.C. 103(a).

Accordingly, Appellants respectfully request that the final rejection of the primary Examiner be reversed and that this application be allowed to go to issue.

Respectfully submitted,

AW Karambelas

Anthony W. Karambelas
Registration No. 25,657

Karambelas & Associates
655 Deep Valley Drive, Suite 303
Rolling Hills Estates, CA 90274
Telephone: (310) 265-9565
Facsimile: (310) 265-9545

APPENDIX

Claims 1-11 as presented below are currently pending in this application.

1. A method of testing a satellite receive antenna of a multibeam satellite system, comprising the steps of:

uplinking a test signal from a payload test earth station to the receive antenna;

slewing the satellite over orientation angles using a slow constant attitude translation;

sensing a power level of the test signal on-board the satellite during slewing;

transmitting downlink telemetry comprising sensed power level and orientation angles of the satellite from the satellite to a telemetry and command earth station that is located at a geographically separate location from the payload test earth station; and

processing the sensed power level and said orientation angles to verify the operation of said receive antenna on the satellite.

2. A method of testing a satellite transmit antenna of a multibeam satellite system, comprising the steps of:

uplinking commands from an earth station to a satellite to cause a translation of the satellite;

transmitting downlink telemetry comprising orientation angles of the satellite from the satellite to a telemetry and command earth station;

measuring downlink noise in a small bandwidth at the telemetry and command earth station while the satellite is translated; and

processing the noise power level and orientation angles to verify operation of the transmit antenna on the satellite.

3. The method recited in Claim 2 wherein the uplinked commands cause a slow constant attitude translation of the satellite.

4. The method recited in Claim 2 wherein the uplinked commands cause a discrete steps in attitude translation of the satellite.

5. A method of generating an input chain frequency response curve for a multibeam satellite communication system, comprising the steps of:

positioning an uplink beam is over an earth station;

uplinking signals at different frequencies of interest from the earth station to the satellite;

generating downlink telemetry on-board the satellite that corresponds to the signal strengths of respective signals at the different frequencies;

transmitting the signal strength telemetry from the satellite to the earth station;

recording the signal strength telemetry and uplink frequency at the earth station; and

processing the recorded signal strength telemetry and uplink frequency to produce the input power frequency response curve.

6. The method recited in Claim 5 wherein the signal strength telemetry is transmitted to a second earth station that is located at a geographically separate location from the uplinking earth station.

7. A method of generating an input chain transfer curve for a multibeam satellite communication system, comprising the steps of:

positioning an uplink beam is over an earth station;

uplinking RF signals at a plurality of power levels from the earth station to the satellite;

generating downlink telemetry on-board the satellite that corresponds to the signal strengths of respective signals at the different power levels;

transmitting the signal strength telemetry from the satellite to the earth station;

recording the signal strength telemetry at the earth station; and

processing the recorded signal strength telemetry to produce the input chain transfer curve corresponding to input power frequency response.

8. The method recited in Claim 7 wherein the signal strength telemetry is transmitted to a second earth station that is located at a geographically separate location from the uplinking earth station.

9. A method of generating an output chain frequency response curve for a multibeam satellite communication system, comprising the steps of:

positioning a downlink beam is over an earth station;

measuring noise power of the downlink beam over a small bandwidth centered around a plurality of selected frequency of interest at the earth station;

processing the noise power measurements to generate the output chain frequency response curve.

10. A method of generating a gain measurement of a transponder of a multibeam satellite communication system, comprising the steps of:

positioning a downlink beam is over an earth station;

measuring noise power of the downlink beam over a small bandwidth at a selected frequency at the earth station;

processing the recorded noise power measurements to generate a gain measurement of the transponder.

11. The method recited in Claim 10 wherein the noise power of the downlink beam is measured at the center of the bandwidth at the selected frequency.